

CLAIMS

What is claimed is:

- 1           1.     A securing apparatus configured to secure a coupling of a first  
2 connector to a compatible second connector, the apparatus comprising:  
3           a moveable securing member configured to be moved from a first position  
4 which prevents the first and second connectors from being decoupled, to a second  
5 position which allows the first and second connectors to be decoupled; and  
6           an actuator configured to move the securing member between the first and  
7 second positions, the actuator being responsive to an authorization command.
  
- 1           2.     The securing apparatus of claim 1, and wherein the first connector  
2 defines a first receiving opening configured to receive the securing member, the  
3 second connector defines a second receiving opening configured to receive the  
4 securing member, and wherein when the connectors are coupled when the  
5 receiving openings are at least partially in alignment.
  
- 1           3.     The securing apparatus of claim 1, and wherein the actuator  
2 comprises a solenoid.
  
- 1           4.     The securing apparatus of claim 3, and wherein the solenoid is an  
2 electrical solenoid, and further wherein the solenoid is configured to move the  
3 securing member to the first position when the solenoid is under power.
  
- 1           5.     The securing apparatus of claim 1, and further comprising a securing  
2 member sensor configured to detect when the securing member is in the first or the  
3 second position, and to generate a position signal in response thereto.
  
- 1           6.     The securing apparatus of claim 5, and wherein the position signal is  
2 used to notify a user of the status of the securing member.

1           7.     The securing apparatus of claim 1, and wherein the authorization  
2     command is generated by a user.

1           8.     The securing apparatus of claim 1, and wherein the authorization  
2     command is generated automatically by a control unit, and wherein the control unit  
3     is configured to remove the first and second connectors from service prior to  
4     authorizing moving the securing member to the second position.

1           9.     A system comprising an array of modules and a plane, each module  
2     having a first connector configured to couple with a compatible, corresponding  
3     second connector which is mounted to the plane, and at least one interlock device,  
4     the interlock device comprising a securing member configured to be moveable to  
5     a first position to engage an associated module and thereby arrest relative  
6     movement between the associated module's first connector and the corresponding  
7     second connector, the securing member being further configured to be moveable  
8     to a second position to disengage the associated module and thereby allow relative  
9     movement between the associated module's first connector and the corresponding  
10    second connector.

1           10.    The system of claim 9, and further comprising an actuator configured  
2     to move the securing member between the first and second positions.

1           11.    The system of claim 10, and further comprising a controller having a  
2     diagnostic program, the diagnostic program being configured to perform diagnostics  
3     on the associated module and to generate a service signal when the diagnostic  
4     program determines that the associated module should be physically removed from  
5     the system for service, and wherein the service signal is used to cause the actuator  
6     to move the securing member from the first position to the second position.

1           12. The system of claim 11, and wherein the controller is further  
2 configured to cause the associated module to be removed from service with  
3 respect to the plane prior to causing the actuator to move the securing member  
4 from the first position to the second position.

1           13. The system of claim 9, and further comprising a securing member  
2 sensor configured to detect when the securing member is in the first or the second  
3 position, and to generate a position signal in response thereto.

1           14. The system of claim 13, and wherein the position signal is used to  
2 signal to a user whether the securing member is in the first or the second position.

1           15. The system of claim 13, and wherein the securing member sensor is  
2 supported by the at least one module.

1           16. A method for securing a first connector to a second connector,  
2 comprising:

3           providing an arresting surface configured to restrict movement of the first  
4 connector when the arresting surface is contacted by a force applied to the first  
5 connector;

6           providing a moveable securing member which is configured to move between  
7 a first position and a second position in response to an authorization command;

8           moving the securing member to a first position which allows relative  
9 movement between the connectors;

10          moving one of the connectors relative to the other connector to bring the  
11 connectors onto mating contact;

12          providing an authorization command to move the securing member from the  
13 first position to the second position; and

14          in response to the authorization command, moving the securing member to  
15 the second position in proximity to the arresting surface to thereby restrict relative  
16 movement between the first and second connectors.

1           17. The method of claim 16, and further comprising detecting the position  
2 of the securing member, and reporting the position of the securing member to a  
3 controller.

1           18. The method of claim 16, and further comprising:  
2 giving a second authorization command to move the securing member back  
3 to the first position;  
4 moving the securing member back to the first position in response to the  
5 second authorization command; and  
6 moving one of the connectors relative to the other connector to move the  
7 connectors out of mating contact.

1           19. The method of claim 18, and further comprising removing the  
2 connectors from service prior to moving the securing member back to the first  
3 position.

1           20. The method of claim 18, and further comprising notifying a user when  
2 the securing member has been moved back to the first position.

1           21. An apparatus for securing a component into a supporting structure,  
2 the component having a release mechanism configured to release the component  
3 from the supporting structure when the release mechanism is actuated by an  
4 operator, the apparatus comprising:  
5 a moveable release mechanism securing member configured to be moved  
6 from a first position which allows the operator access to the release mechanism,  
7 to a second position which denies the operator access to the release mechanism;  
8 and  
9 an actuator configured to move the release mechanism securing member  
10 between the first and second positions, the actuator being responsive to an  
11 authorization command.

1           22. The apparatus of claim 21, and wherein the release mechanism  
2     securing member comprises a moveable cover which is connected to the actuator,  
3     and which covers at least a portion of the release mechanism when the moveable  
4     cover is in the second position.

1           23. The apparatus of claim 22, and wherein the release mechanism  
2     comprises a moveable latch having a handle portion, and wherein the moveable  
3     cover covers at least a portion of the handle portion when the moveable cover is  
4     in the second position.

1           24. The apparatus of claim 21, and wherein the release mechanism  
2     securing member comprises a connecting member which connects the actuator to  
3     the release mechanism, and further wherein when the connecting member is in the  
4     first position, the release mechanism is moved to a first position which allows the  
5     operator access to the release mechanism, and when the connecting member is in  
6     the second position, the release mechanism is moved to a second position which  
7     denies the operator access to the release mechanism.

1           25. The apparatus of claim 24, and wherein the wherein the release  
2     mechanism comprises a moveable latch having a handle portion, and wherein the  
3     component comprises a recess into which the handle portion of the latch can be  
4     moved, further wherein the connecting member moves the handle portion of the  
5     latch into the recess when the connecting member is in the second position.

1           26. A disk array system comprising a plurality of disk devices and a  
2     chassis, the disk devices being removably supported in the chassis, and at least  
3     one apparatus configured to secure at least one of the disk devices in the chassis,  
4     the securing apparatus being configured to be responsive to an authorization  
5     command to prevent a user from removing the at least one disk device from the  
6     chassis in the absence of the authorization command.

1           27. The disk array system of claim 26, and wherein the securing  
2 apparatus comprises a moveable securing member configured to be moved, in  
3 response to the authorization command, from a first position which prevents the  
4 at least one disk device from being removed from the chassis, to a second position  
5 which allows the disk device to be removed from the chassis.

1           28. The disk array system of claim 26, and wherein the at least one disk  
2 device comprises a release mechanism configured to release the disk device from  
3 the chassis when the release mechanism is actuated by the user, and further  
4 wherein the securing apparatus comprises a moveable release mechanism securing  
5 member configured to be moved, in response to the authorization command, from  
6 a first position which allows the user access to the release mechanism, to a second  
7 position which denies the user access to the release mechanism.

1           29. The disk array system of claim 26, and further comprising a controller  
2 configured to detect when the at least one disk device has been removed from  
3 service, and to subsequently generate the authorization command.

009260" 07284960